

Contents

The Effect of the COVID-19 Recession on Public Infrastructure Needs Interim Report
Phase Two: Effects of the Great Recession and COVID-19 Recession Compared 1

With the exception of K-12 education technology, the pandemic appears to have had
little effect on the needs reported in TACIR’s Public Infrastructure Needs Inventory. 4

Average Cost of Needs and Completed Projects Reported 4

Types of Needs Reported and Needs Completed 6

Project Progression 8

Funding for Public Infrastructure Needs 9

References 14

Persons Contacted..... 16

DRAFT

The Effect of the COVID-19 Recession on Public Infrastructure Needs Interim Report Phase Two: Effects of the Great Recession and COVID-19 Recession Compared

The world was faced with unanticipated challenges triggered by the spread of COVID-19. As discussed in staff’s 2021 first interim report, *The Effect of the COVID-19 Recession on Public Infrastructure Needs*, whether or the extent to which these challenges affected the public infrastructure needs of Tennessee communities was among the many uncertainties stemming from the pandemic. To address this question, staff conducted a two-phase analysis of the data it collects on public infrastructure needs in Tennessee, which shows that the pandemic recession had no effect on reported public infrastructure needs. However, the shift to remote learning resulting from the pandemic increased the need for technology in K-12 schools.

Phase one of this analysis in the first interim staff report examined the Great Recession—which occurred from December 2007 through June 2009—and the decade following it to establish a baseline for analyzing the effect on public infrastructure needs of the COVID-19 pandemic recession, which took place in March and April 2020. Staff did not uncover any major shift in needs stemming from the Great Recession—whether in terms of dollar amount, project type, or project progression. In general, Tennessee’s reported public infrastructure needs increased alongside an expanding economy over the decade leading up to the COVID-19 pandemic.¹

Phase two of staff’s analysis—presented in this staff report—examines whether, or to what extent, the COVID-19 pandemic affected the public infrastructure needs reported in Tennessee as of July 1, 2021. A summary of the information presented in the first interim report is worth revisiting: The Tennessee Department of Health reported the first confirmed case of COVID-19 in the state on March 5, 2020²—closures of some schools, government offices, and businesses shortly followed. Governments, businesses, and other organizations implemented measures intended to reduce the spread of COVID-19—including limiting in-person gatherings and moving to virtual platforms to continue operations when feasible.

¹ Johnson et al. 2021.

² Tennessee Office of the Governor “COVID-19 Timeline”.

Not only did COVID-19 cause a global health crisis, it also caused significant social and economic disruptions. But while cities and counties across Tennessee experienced an initial reduction in economic activity and high unemployment as businesses shut down at the beginning of the pandemic, many local officials reported an unexpected increase in sales tax revenue from residents shopping locally or online.³ This increase in sales tax revenue from online purchases is in part the result of laws and rule changes adopted in Tennessee following the US Supreme Court ruling in *South Dakota v. Wayfair* (2018), which overturned past rulings that had prohibited states from requiring out-of-state sellers to collect and remit sales tax from online sales. In the five years since, sales tax collections statewide have continued to increase year-over-year.

Furthermore, a drastically lower unemployment rate compared with the year prior to the pandemic and record-setting growth in new business filings, among other indicators, demonstrated a strong economic recovery was already underway in the state as of 2021.⁴ As of the summer of 2023, the state's economy has continued to grow at a steady pace.

So how did the pandemic affect public infrastructure needs in Tennessee? During the pandemic, more people worked from home, and commuting declined, which may have reduced wear and tear on transportation infrastructure. At the same time, consumers turned to online ordering and delivery services rather than shopping in person, and as a result, long-distance transportation of consumer goods and home deliveries may have increased road use by trucks and other delivery vehicles. For many Tennesseans, the shift to remote work and learning highlighted needed improvements in broadband infrastructure. The pandemic also highlighted technological infrastructure needs in public schools, including computers and other electronic devices. In a survey of Tennessee local government officials, 95.8% responded that the pandemic had a significant effect on their school system. In those cities and counties that operate a school system, every official who responded to the survey indicated that the pandemic has increased the need for technology for public schools. Furthermore, while tax collections in Tennessee performed better than expected overall in 2020 (and continue to grow), the federal government passed several funding assistance measures, benefiting both state and local governments.⁵

³ TACIR staff survey of Tennessee city and county government officials.

⁴ Hargett 2021.

⁵ Tennessee Department of Transportation "Gas Tax."

The Commission's *Public Infrastructure Needs Inventory* can be used to assess the effects of the pandemic, if any, on public infrastructure needs. Recognizing the importance of public infrastructure, the Tennessee General Assembly in 1996 charged the Commission with creating and maintaining an inventory of public infrastructure needs "in order for the state, municipal, and county governments of Tennessee to develop goals, strategies, and programs which would

- improve the quality of life of its citizens,
- support livable communities, and
- enhance and encourage the overall economic development of the state."⁶

Public infrastructure is defined, for purposes of the inventory, as capital facilities and land assets under public ownership or operated or maintained for public benefit. To be included in the inventory, infrastructure projects must not be considered normal or routine maintenance and, except for school technology infrastructure, must involve a capital cost of at least \$50,000. School technology infrastructure is included for existing schools regardless of cost⁷ because this information is not compiled on a statewide level by any other organization.

Each year, with assistance from the state's nine development districts, Commission staff gather information from state and local officials for the inventory. Each new "inventory year" includes the infrastructure improvements reported as needed at some point in the following five years, such that the inventory year 2007 captures improvements that state and local officials said would be needed between July 1, 2007, and June 30, 2012, and so on. The reported information allows staff to assess a variety of changes in the state's infrastructure needs over time—including whether there have been changes in the overall amount of needs reported, the relative amount of specific types of needs, and the progression of reported needs to completion. These changes, when analyzed alongside other socioeconomic factors, may help the state and local governments better understand whether, or to what extent, economic downturns affect public infrastructure needs and how to adjust public infrastructure project planning and funding in response to any such effects.

The most recent data available for staff capture needs reported as of July 1, 2021, and covers the period July 1, 2021, through June 30, 2026. Longer term effects of federal

⁶ Public Chapter 817, Acts of 1996.

⁷ Tennessee Advisory Commission on Intergovernmental Relations 2023.

funding that became available after July 1, 2021 are not captured in the data; however, staff will continue to analyze trends which will be reported in the annual infrastructure report.

With the exception of K-12 education technology, the pandemic appears to have had little effect on the needs reported in TACIR's Public Infrastructure Needs Inventory.

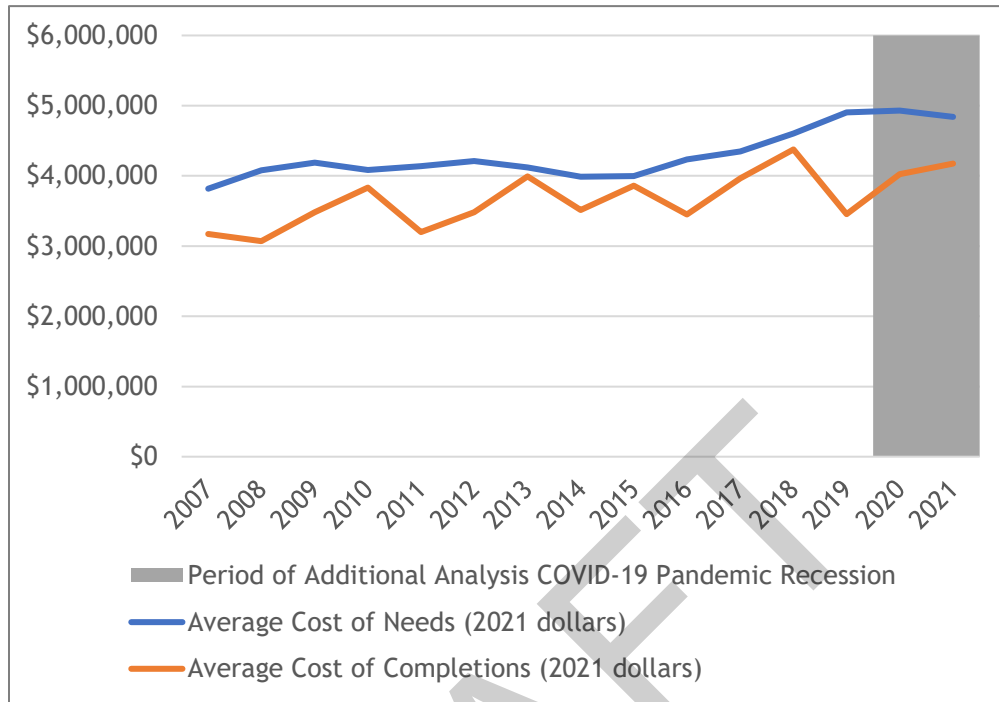
In general, the COVID-19 pandemic had little effect on the identified needs and trends in needs reported in TACIR's Public Infrastructure Needs Inventory. Similarly, staff found in the first interim report that the Great Recession had no effect on public infrastructure needs. When analyzing data in the *Public Infrastructure Needs Inventory* for both reports, Commission staff looked for trends in the average cost of needs reported and completed projects, the types of needs reported, and the progression of reported project needs.

Average Cost of Needs and Completed Projects Reported

From 2007 to 2019, which includes the period of the Great Recession and the years following, the average cost of needed projects consistently remained higher than the average cost of completed projects, despite changing economic conditions during this period. This trend remained unchanged in 2020 and 2021 despite the COVID-19 pandemic and the short-lived recession that occurred in March and April 2020.

However, in 2021, for the first time in five years, the average cost of needs reported dropped—by 1.8%. The average cost of needs had increased steadily from 2016 to 2020—4.3% per year on average. While the pandemic and related recession may have led to the recent decrease, it is likely that the increase in the average cost of completed projects also played a part because once a project is completed it is no longer reported as a need in the inventory, which effectively reduces the average cost of needs. See figure 1.

**Figure 1. Average Cost of Needs and Completions
(in 2021 dollars)**



Source: TACIR staff analysis of data used in TACIR’s 2023 infrastructure report.

Other factors may also affect the average cost of needs reported and the average cost of completions. Prior TACIR analyses consistently found that five factors are correlated with public infrastructure needs and the ability to meet those needs: taxable property, taxable sales, income, population, and population gain or loss. Of these, population is the most significant in relation to infrastructure needs and the second most significant for completed needs—the need for infrastructure is driven by population factors rather than funding-related factors that could be affected by economic downturns. The average cost of completed projects is more closely tied with taxable property—a funding-related factor.⁸ However, the amount of taxable property in a community does not necessarily decrease during economic downturns, though property tax collections may.⁹ In fact, taxable property remained steady throughout the Great Recession and the pandemic. Population growth, on the other hand, slowed in 2020, then returned to the pre-recession growth rate in 2021.

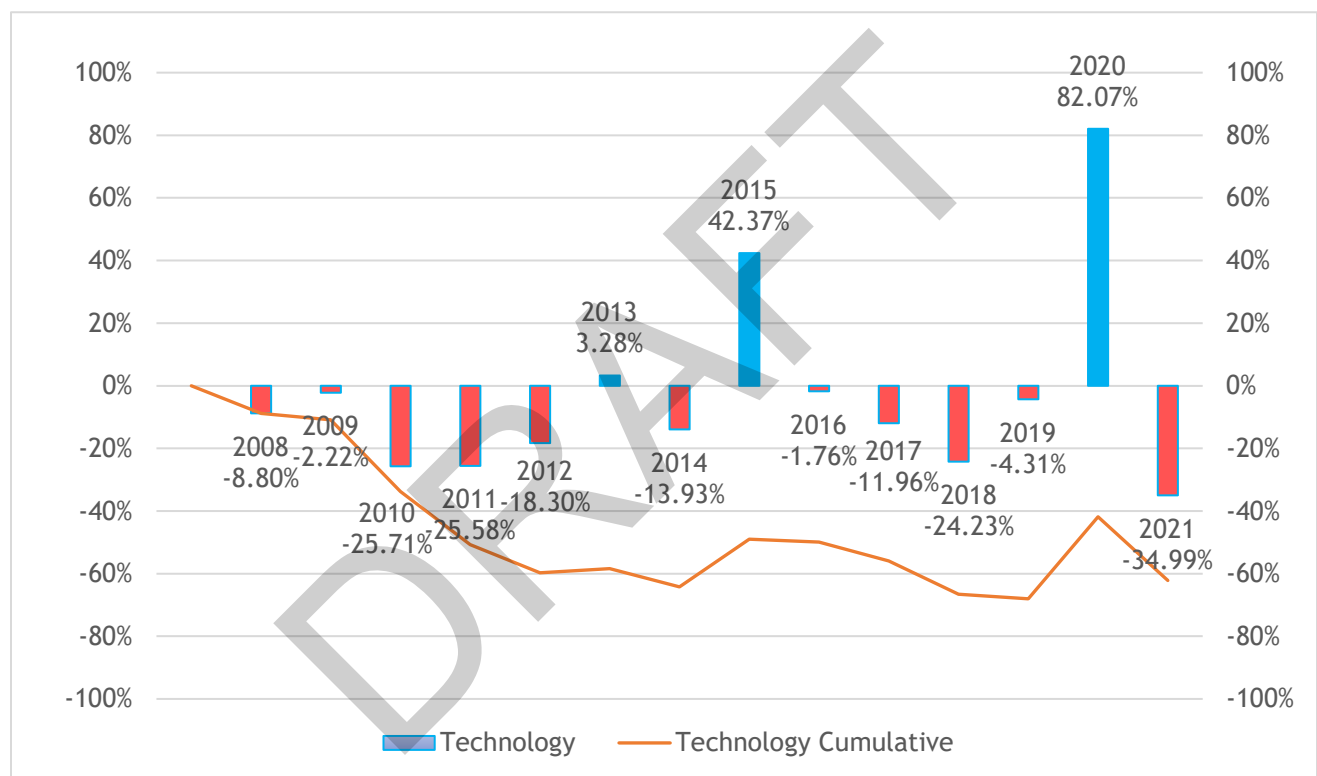
⁸ Tennessee Advisory Commission on Intergovernmental Relations 2016.

⁹ Johnson et al. 2021.

Types of Needs Reported and Needs Completed

Neither the Great Recession and the subsequent recovery nor the COVID-19 pandemic had much effect on the overall cost per capita of reported needs from 2007 to 2021. However, one type of education need—technology—was affected by the COVID-19 pandemic. School technology needs, including purchases of laptops and Wi-Fi hotspots for remote learning, increased by a total of \$103.7 million (\$15 per capita) from 2019 to 2020 and then decreased the following year. See figure 2.

Figure 2. Percent Change in Cost per Capita of Reported Needs for Technology Projects Year-over-Year and Cumulative Change 2007 to 2021 (in 2021 dollars)

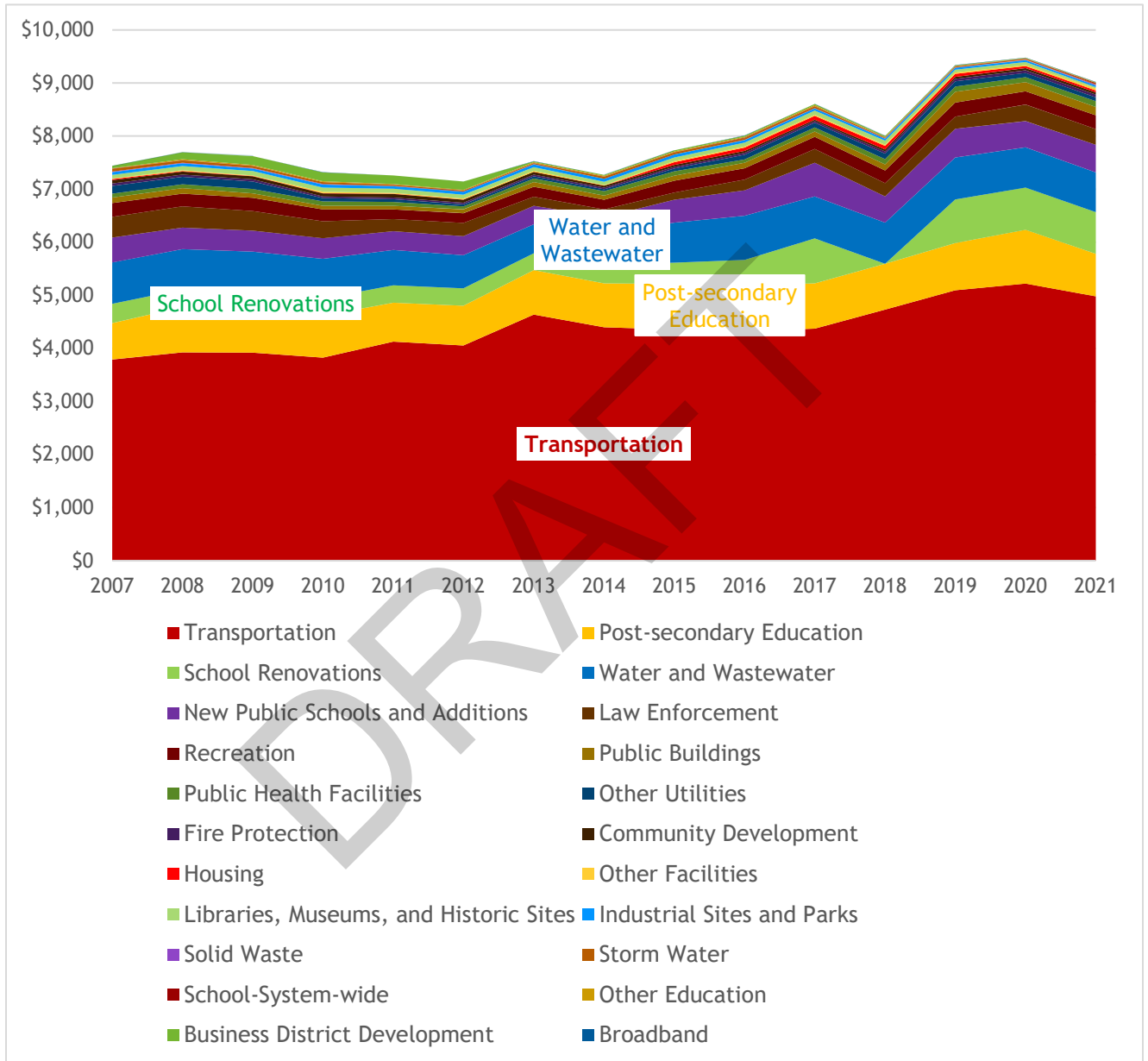


Source: TACIR staff analysis of data used in TACIR’s 2023 infrastructure report

From 2007 to 2019, the inflation-adjusted average cost per capita of reported needs in the inventory generally increased for many individual project types as the economy grew following the Great Recession. In 2020 and 2021, however, costs leveled off for most categories (see figure 3). Whether this represents a short-term shift or the beginning of a new long-term trend in the inventory resulting from the COVID-19 pandemic and recovery remains to be seen. Any changes in trends will be noted in the annual infrastructure report. For example, air filtration systems could be a new type of need for schools in the future, and in fact, in 2021, one school district in Tennessee reported the

need for air filtration in all school rooms as part of a large district-wide energy efficiency upgrade.

Figure 3. Cost per Capita of Reported Needs by Project Type (in 2021 dollars)

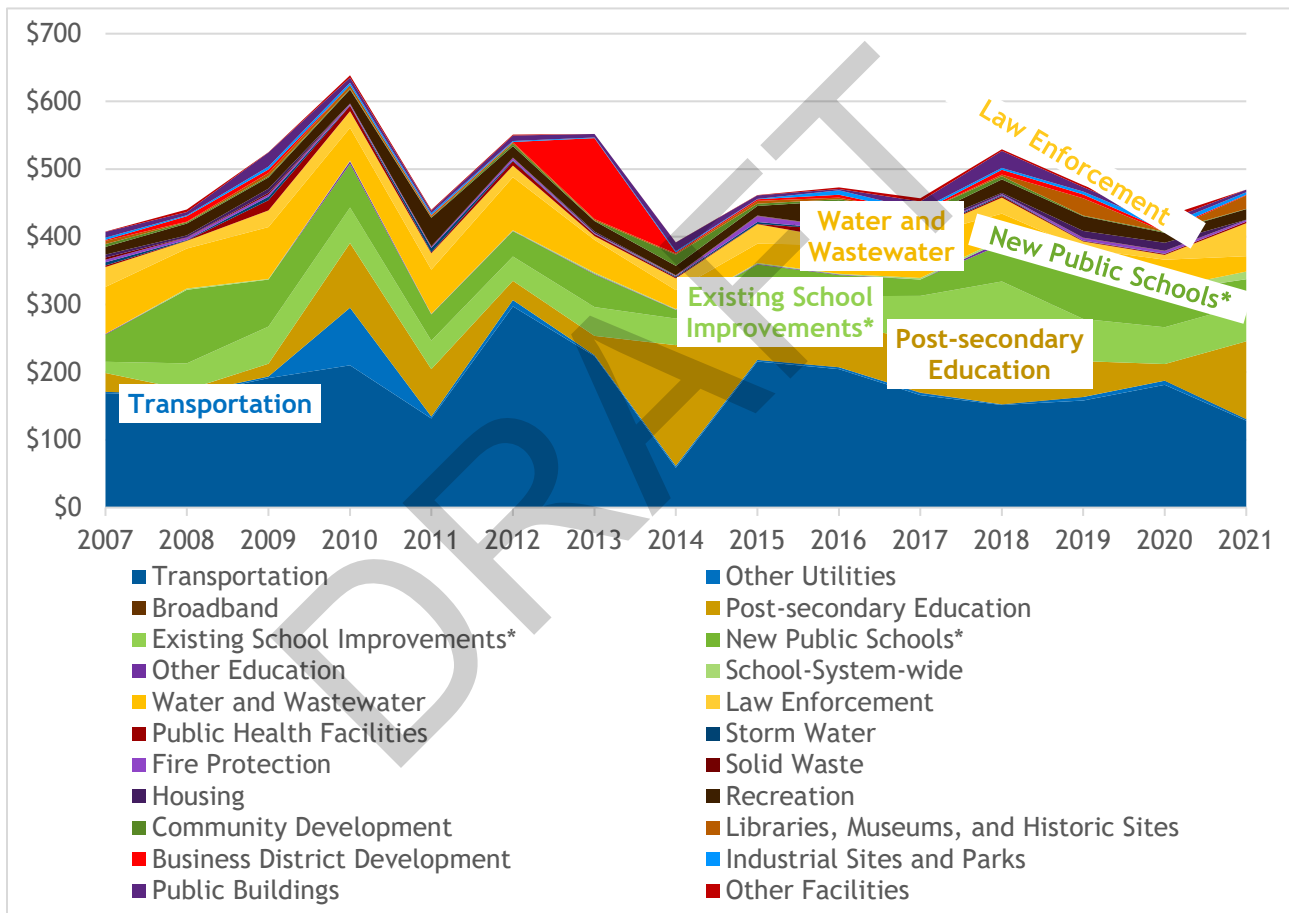


Source: TACIR staff analysis of data used in TACIR's 2023 infrastructure report.

Though the Great Recession and subsequent recovery did not cause a major shift in the types of infrastructure needs reported, they may have contributed to the completion of projects in categories for which funds from the American Recovery and Reinvestment

Act—one of several legislative efforts to combat the Great Recession—were directed, such as transportation. Likewise, Congress passed legislation in response to the COVID-19 pandemic that may contribute to the completion of targeted project types, such as school renovation and technology through the Coronavirus Aid, Relief, and Economic Security (CARES) Act, and water, wastewater, and broadband through the American Rescue Plan (ARP) Act. Because federal funding is not tied to specific infrastructure projects, the effect of the legislation on completed projects is not clear. See figure 4 for year-to-year changes in the cost of public infrastructure needs reported as complete by category.

Figure 4. Reported Costs for Completed Projects per Capita (in 2021 dollars)



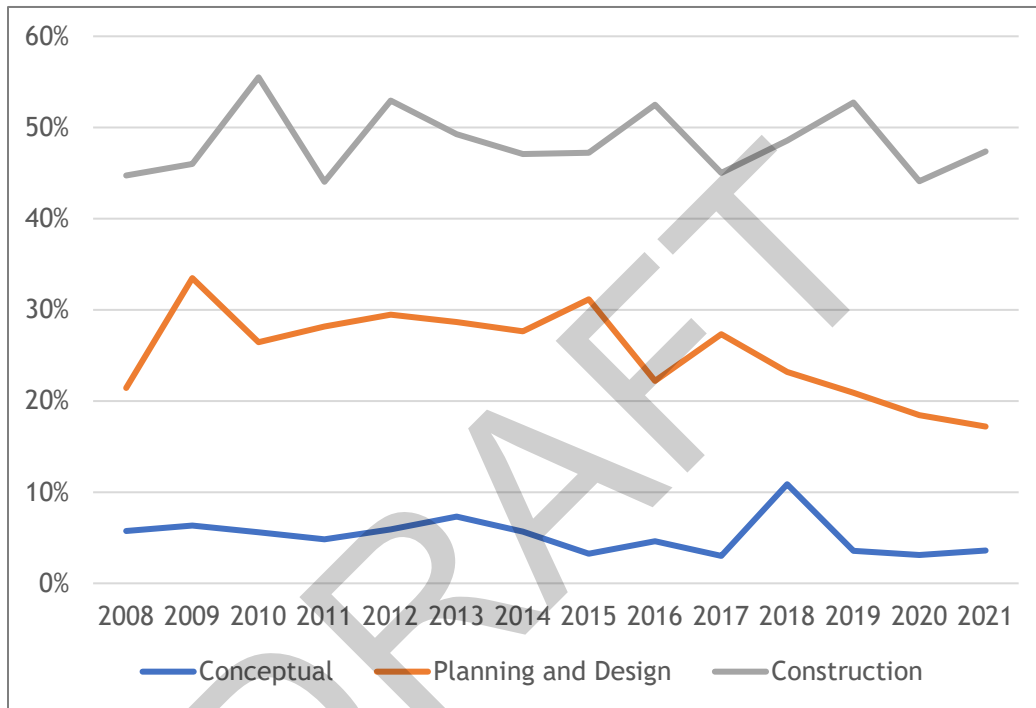
Source: TACIR staff analysis of data used in TACIR’s 2023 infrastructure report.

Project Progression

Changing economic conditions during and following the Great Recession did not appear to affect the overall rate at which infrastructure projects progressed from one stage to the next—stages include conceptual, planning and design, construction, and completed. The

percentage of projects advancing from the construction stage from year-to-year has fluctuated since 2007—increasing slightly overall. Progression from the planning and design stage has continued a downward trend since 2009 and, except for a large increase in 2018, progression from the conceptual stage has remained mostly flat. This does not appear to have been affected by the COVID-19 pandemic. See figure 5.

Figure 5. Percentage of Projects that Progressed to a More Advanced State by Stage and Inventory Year



Source: TACIR staff analysis of data used in TACIR’s 2023 infrastructure report. Projects progress through four stages of development—conceptual, planning & design, construction, and completion.

Funding for Public Infrastructure Needs

Public infrastructure in Tennessee is funded in large part through state and local taxes and federal funding. While the Great Recession led to a decrease in revenue from state and local sales tax and gasoline and motor fuel tax, the COVID-19 pandemic recession only saw a decrease in gasoline and motor fuel tax revenue. Of the two events, the economic effect of the COVID-19 pandemic recession on tax revenue was shorter and deeper, but the recovery was swift. While the Great Recession was driven by a housing and banking crisis, the COVID-19 pandemic recession was “influenced by ebbs and flows

in virus caseloads”—once the caseload declined, economic activity picked back up.¹⁰ Additionally, implementation of state and local sales tax collection from remote sellers coincided with the timing of the pandemic—the author of a 2023 article said “the 2018 [South Dakota v. Wayfair] decision was fortuitous, coming just ahead of the pandemic when state sales tax revenues would skyrocket as consumers turned to online shopping amid stay-at-home orders.”¹¹

Though state and local tax revenue may suffer during an economic downturn, Congress may pass stimulus legislation to help state and local governments recover, which it did in both the Great Recession and the COVID-19 pandemic recession. While some federal stimulus funding has been made available to local governments and may be represented in the infrastructure inventory, the American Rescue Plan Act of 2021 funding will not be reflected in TACIR’s annual infrastructure report until at least 2024.

State and Local Sales Tax Revenue

Unlike the Great Recession, state and local sales tax collection remained strong during and after the COVID-19 pandemic recession. During the Great Recession, 75 of 95 counties in Tennessee saw a decline in sales tax receipts—7% on average. State sales tax collection took nine years—from 2007 to 2016—to regain pre-recession levels when adjusting for inflation.

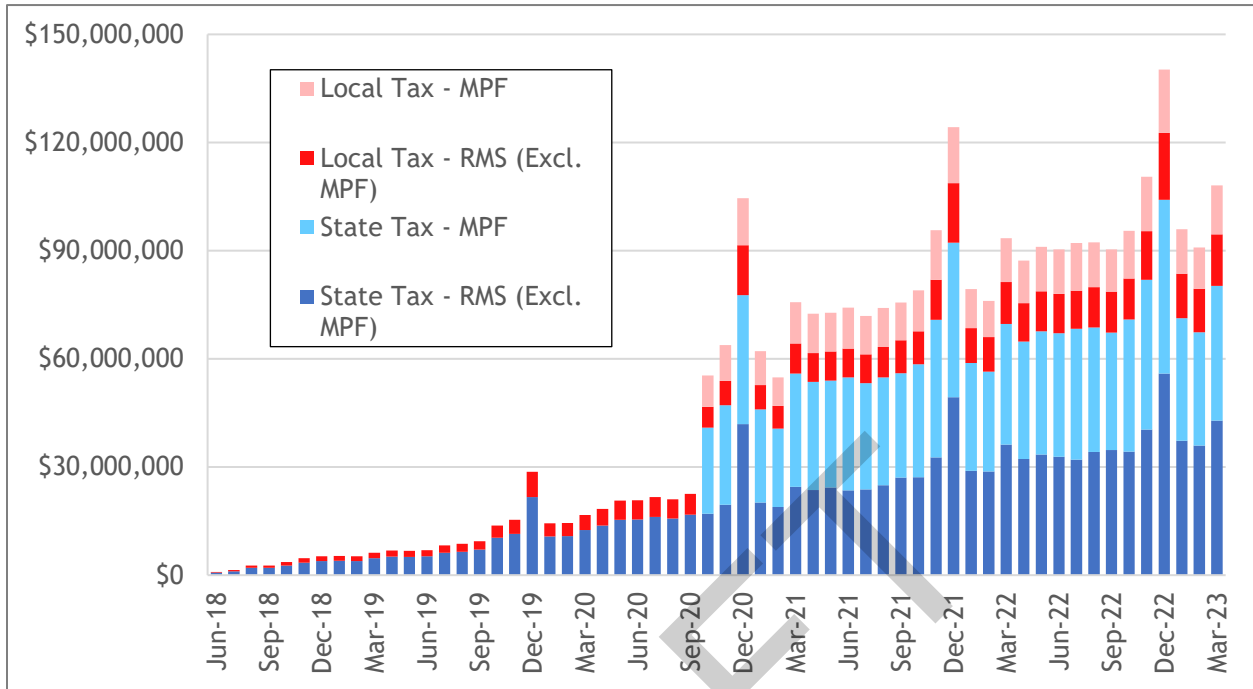
While tax revenues typically decline during a recession, “collections performed much better during the COVID-19 recession and initial rebound than in previous economic downturns.”¹² For example, comparing December 2020 to December 2022, state and local sales tax due by remote sellers increased from \$104.5 million to \$140.2 million in Tennessee, an annualized increase of 15.8%. Figure 6 below—covering the period of June 2018 through February 2023—shows the increase in state and local sales tax collections from remote marketplace sellers (stores that sell online) and marketplace facilitators (such as eBay and Amazon) that occurred following the *Wayfair* decision.

¹⁰ Center for Budget and Policy Priorities 2023.

¹¹ Farmer 2023.

¹² Kessler et al. 2021.

Figure 6. State Local Sales Tax Due by Remote Sellers



Note: MPF stands for marketplace facilitator, such as Amazon or eBay. RMS stands for remote seller—a person or business that sells online but does not have a physical presence in the state.

Source: Data was provided in an email from Kirk Johnson, statistical research specialist, Tennessee Department of Revenue, September 6, 2023.

Gasoline and Motor Fuel Tax Collections

Revenue collected from gasoline and motor fuel taxes—which include gasoline, motor fuel, and gasohol (gasoline and ethyl alcohol blend)—may have been temporarily affected by the COVID-19 pandemic recession. For instance, with the COVID-19 pandemic decreasing the number of drivers on the road, revenues from gasoline and motor fuel taxes dipped in 2020 and have since rebounded.¹³ The gasoline tax was created in 1923 to generate revenue for road maintenance, and therefore use of this tax revenue is restricted to transportation projects. Since 2019, the gasoline tax rate has been 26 cents per gallon, and the motor fuel (diesel) tax rate has been 27 cents per gallon.¹⁴

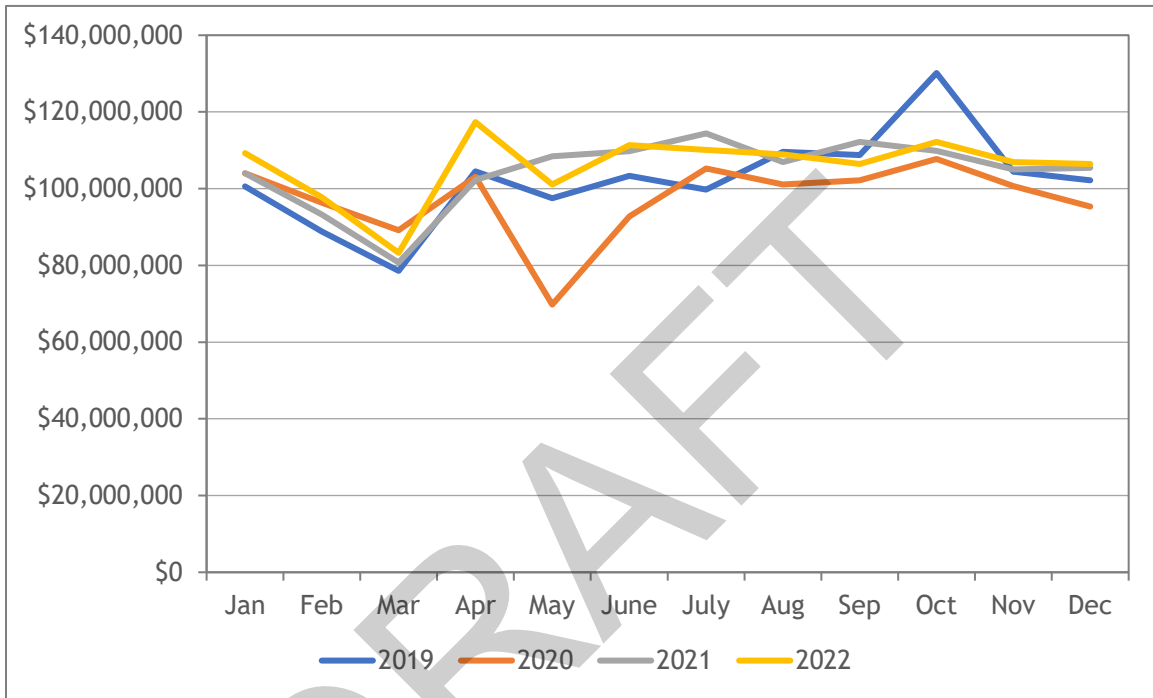
As noted in the 2021 TACIR staff report, at the beginning of the COVID-19 pandemic in March 2020, gasoline tax revenue remained strong with a \$6.8 million increase from 2019 with other motor fuel taxes increasing by \$3.5 million over the same period. However,

¹³ Hasnat and Bardaka 2022.

¹⁴ Tennessee Department of Transportation “History of Tennessee’s Gas/Fuel Tax Rates.”

by May 2020, monthly fuel tax revenues dipped to \$69.8 million, well below the \$97.5 million in revenue that was collected in May 2019. Though this was the lowest point for fuel tax collection during the pandemic, except for a small increase in July of 2020, revenue from motor fuel taxes would remain below pre-pandemic levels through March 2021. Fuel tax collections returned to normal through April and May 2021. See figure 7.

Figure 7. Monthly Fuel Tax Collections, January 2019 through December 2022



Note: Monthly fuel taxes includes gasoline, motor fuel, and special petroleum taxes.

Source: Tennessee Department of Revenue “Monthly Fiscal Year Collections.”

Federal Funding

In response to the challenges of the COVID-19 pandemic recession, as it did in response to the Great Recession, Congress passed several pieces of legislation to ease the burden on families, businesses, state and local governments, and many other entities. According to the Committee for a Responsible Federal Budget, Tennessee received approximately \$70.4 billion dollars in relief—primarily through the CARES Act (\$22.2 billion) and the American Rescue Plan (\$23.2 billion).¹⁵ Funding made available through federal legislation may have directly or indirectly affected the need for public infrastructure.

¹⁵ Committee for a Responsible Federal Budget 2023.

The CARES Act of 2020 required states and local governments to use the funds to cover pandemic-related costs that were not anticipated in their budgets prior to March 2020.¹⁶ Tennessee received \$2.7 billion¹⁷—\$61 million of which was awarded by the state to municipalities and private entities through emergency broadband grants.¹⁸ The CARES Act also allocated \$260 million to Tennessee through the Elementary and Secondary School Emergency Relief fund—39.3% of that amount was directed towards technology, high-speed internet, and facility upgrades.¹⁹

In 2021, the ARP Act, which included funding for Coronavirus State and Local Fiscal Recovery Funds. It is through this funding that the Tennessee Department of Environment and Conservation (TDEC) received \$1.4 billion to enhance water and wastewater infrastructure—\$1 billion in non-competitive grants and \$350 million for state-initiated projects.²⁰ TDEC began announcing grant awards in August 2022, and the agency has announced a total of \$934 million in awards as of June 16, 2023.²¹ Additionally, ARP Act funding for Tennessee included \$500 million for broadband infrastructure²²—approximately \$107 million has been awarded to municipal electric systems.²³

¹⁶ Internal Revenue Service 2023.

¹⁷ A portion of this remains unallocated. The allocated amount is \$2.39 billion, and this is specifically allocated to the coronavirus relief fund.

¹⁸ Tennessee Office of the Governor 2020.

¹⁹ State Collaborative on Reforming Education 2022.

²⁰ Tennessee Department of Finance and Administration 2023.

²¹ Ibid.

²² Ibid.

²³ Dollar figure calculated by TACIR staff using a spreadsheet provided by Taylre Beaty, state broadband director, Tennessee Department of Economic and Community Development, November 28, 2022.

References

- Center for Budget and Policy Priorities. 2023. "Chart Book: Tracking the Recovery From the Pandemic Recession." Last modified July 11, 2023. <https://www.cbpp.org/research/economy/tracking-the-recovery-from-the-pandemic-recession>.
- Committee for a Responsible Federal Budget. 2023. "COVID Money Tracker." Last modified September 1, 2023. <https://www.covidmoneytracker.org/>.
- Farmer, Liz. 2023. "Five Years After the Wayfair Ruling, States' Reliance on the Sales Tax Grows." *Route Fifty*, June 20. <https://www.route-fifty.com/finance/2023/06/five-years-after-wayfair-ruling-states-reliance-sales-tax-grows/387699/>.
- Hargett, Tre. 2021. "Tennessee Quarterly Business and Economic Indicators" Q1 2021. May 2021. <https://sos.tn.gov/businesses/services/tennessee-quarterly-business-and-economic-indicators-reports>.
- Hasnat, Md. Mehedi, and Eleni Bardaka. 2022. "Exploring the Efficacy of Traditional and Alternative Funding Mechanisms to Provide Transportation Revenue During the COVID-19 Pandemic." *Case Studies on Transport Policy* 10 (2): 1249-1261. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9023379/>.
- Internal Revenue Service. 2023. "CARES Act Coronavirus Relief Fund Frequently Asked Questions." Last modified January 31, 2023. <https://www.irs.gov/newsroom/cares-act-coronavirus-relief-fund-frequently-asked-questions>.
- Johnson, Emma, Bob Moreo, Michael Mount, Matt Owen, Mark McAdoo, and Melissa Brown. 2021. *The Effect of the COVID-19 Recession on Public Infrastructure Needs, Interim Report: Lessons Learned from the Great Recession (December 2007 – June 2009) and Early Observations from Local Government Officials*. https://www.tn.gov/content/dam/tn/tacir/2021publications/2021PINISpecialProject_StaffReport.pdf.

Kessler, Lawrence M., Donald J. Bruce, Celeste K. Carruthers, William F. Fox, Enda P. Hargaden, Vickie C. Cunningham, Alex S. Norwood, and Richard H. Beem, Jr. 2021. *An Economic Report to the Governor of the State of Tennessee: The State's Economic Outlook January 2021*. University of Tennessee Boyd Center for Business and Economic Research. <https://haslam.utk.edu/publication/economic-report-to-the-governor/>.

State Collaborative on Reforming Education. 2022. "COVID-19 Impact Memo." https://tnscore.org/wp-content/uploads/2022/03/Trends-In-ESSER-3-2020_FINAL.pdf.

Tennessee Advisory Commission on Intergovernmental Relations. 2016. *Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs*. <https://www.tn.gov/content/dam/tn/tacir/infrastructure/2016-infra-2014-2019/2016Infrastructure.pdf>.

———. 2023. *Building Tennessee's Tomorrow: Anticipating the State's Infrastructure Needs*. <https://www.tn.gov/tacir/infrastructure/infrastructure-reports-/building-tennessee-s-tomorrow-2021-2026.html>.

Tennessee Department of Finance and Administration. 2023. "Tennessee Resiliency Plan." Last modified March 22, 2023. https://www.tn.gov/content/dam/tn/finance/documents/financial-stimulus-accountability-group/041823_Tennessee_Resiliency_Plan.pdf.

Tennessee Department of Revenue. "Monthly Fiscal Year Collections." Accessed September 18, 2023. <https://www.tn.gov/revenue/tax-resources/tax-collections-information/monthly-fiscal-year-collections.html>.

Tennessee Department of Transportation. "Gas Tax." Accessed June 22, 2021. <https://www.tn.gov/tdot/finance/gas-tax.html>.

———. "History of Tennessee's Gas/Fuel Tax Rates." Accessed September 6, 2023. <https://www.tn.gov/tdot/finance/gas-tax/gas-tax-history.html>.

Tennessee Office of the Governor. "COVID-19 Timeline." Accessed September 13, 2023. <https://www.tn.gov/governor/covid-19/covid19timeline.html>.

———. 2020. "Gov. Lee Announces \$61 Million in Emergency Broadband Grants." Press release, August 21. <https://www.tn.gov/governor/news/2020/8/21/gov-lee-announces--61-million-in-emergency-broadband-grants.html>.

Persons Contacted

Taylre Beaty, State Broadband Director
Tennessee Department of Economic and Community Development

Kirk Johnson, Statistical Research Specialist
Tennessee Department of Revenue

Vena Jones, Manager
State Revolving Fund & Water Infrastructure Grants
Tennessee Department of Environment and Conservation

DRAFT